

Patent Claims

1. Pulsed laser arrangement for generating laser pulses with adjustable pulse length in which a diode-pumped, Q-switched solid state laser with variable oscillator output is provided for supplying oscillator pulses, characterized in that a multistage laser amplifier in which an amplifying medium with a small-signal amplification of more than 10 is provided in every stage is arranged downstream of the Q-switched solid state laser oscillator, wherein the total small-signal amplification brought about by all of the amplifying media is greater than 1000.
2. Pulsed laser arrangement according to claim 1, characterized in that the mode-matched beams of the pump radiation and of the laser radiation (15) to be amplified have a mode cross section of less than 0.5 mm^2 in every amplifying medium.
3. Pulsed laser arrangement according to claim 1 or 2, characterized in that the solid state laser oscillator contains as active medium an anisotropic laser crystal (1) which is pumped by an asymmetric pump beam (6) whose cross section has different dimensions perpendicular to one another and which is traversed by a laser beam cross section which is adapted to this asymmetry and which has an axial ratio in directions extending perpendicular to one another of greater than 1:1 and less than 1:3.
4. Pulsed laser arrangement according to claim 3, characterized in that the axis of the crystallographic axes of the anisotropic laser crystal (1) in whose direction the highest value of the crystal stress limit is present is oriented along the greatest temperature gradient located in direction of the smaller dimension of the pump beam cross section.
5. Pulsed laser arrangement according to claim 4, characterized in that the anisotropic laser crystal (1), which contains a crystal cross section which is traversed by the pump beam and which has crystal edges (7 - 10) of different length oppositely located parallel to one another in pairs, has its greatest thermal expansion coefficient in the direction of the smaller dimension of the pump beam cross section and parallel to the crystal edge (7, 8) with the shorter edge length.
6. Method for adjusting the pulse length of laser pulses by varying the output of a diode-pumped Q-switched solid state laser oscillator for providing oscillator pulses, characterized in that the oscillator pulses are supplied to a multistage laser amplifier and are amplified in every stage by a small-signal amplification of greater than 10, but at least with a

total small-signal amplification of greater than 1000.

7. Method according to claim 6, characterized in that the pulse length is adjusted by changing the pump beam output by means of the diode current of the pump beam source.